



US006697361B2

(12) **United States Patent**  
Fredette et al.

(10) Patent No.: **US 6,697,361 B2**  
(45) Date of Patent: **\*Feb. 24, 2004**

(54) **METHOD AND APPARATUS FOR STREAM AGGREGATION IN A MULTIPROTOCOL LABEL SWITCHING NETWORK ENVIRONMENT**

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(\*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/153,638**

(22) Filed: **Sep. 15, 1998**

(65) **Prior Publication Data**

US 2002/0110119 A1 Aug. 15, 2002

(51) Int. Cl.<sup>7</sup> ..... **H04L 12/56**

(52) U.S. Cl. .... **370/389; 370/395.1**

(58) Field of Search ..... **370/355, 389, 370/392, 409, 410, 431, 432, 905, 395.1, 396, 395.3, 395.31, 395.5, 400, 411, 352, 351, 401; 709/230, 237, 238, 242, 200**

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

5,903,559 A \* 5/1999 Acharya et al. .... 370/355  
5,917,820 A \* 6/1999 Rekhiter ..... 370/392  
5,991,300 A \* 11/1999 Tappan ..... 370/392  
6,009,097 A \* 12/1999 Han ..... 370/395  
6,021,263 A \* 2/2000 Kujoory et al. .... 395/200.62  
6,031,841 A \* 2/2000 Woundy ..... 370/410

6,038,230 A \* 3/2000 Ofek ..... 370/389  
6,055,561 A \* 4/2000 Feldman et al. .... 709/200  
6,069,889 A \* 5/2000 Feldman et al. .... 370/351  
6,092,113 A \* 7/2000 Maeshima et al. .... 709/230  
6,101,549 A \* 8/2000 Baugher et al. .... 709/238  
6,205,488 B1 \* 3/2001 Casey et al. .... 709/238  
6,332,198 B1 \* 12/2001 Simons et al. .... 714/6

#### FOREIGN PATENT DOCUMENTS

GB 2320159 A 6/1998

#### OTHER PUBLICATIONS

Rosen et al., MPLS Architecture, Jul. 1998, Internet Draft, pp. 1-64.\*

Nancy Feldman and Arun Viswanathan. "ARIS Specification." Mar. 1997. Internet Draft. Advanced Networking Technologies IBM. pp. 1-36.\*

Arun Viswanathan, Nancy Feldman, Zheng Wang, and Ross Callon. "Evolution of Multiprotocol Label Switching." May 1998. IEEE Communications Magazine. pp. 165-173.\*

Ross Callon, Paul Doolan, Nancy Feldman, Andre Fredette, George Swallow, and Arun Viswanathan. "A Framework for Multiprotocol Label Switching." Apr. 3, 1997. <http://cell-relay.indiana.edu/mhonarc/mppls/1997-Apr/sg00010.html>.\*

(List continued on next page.)

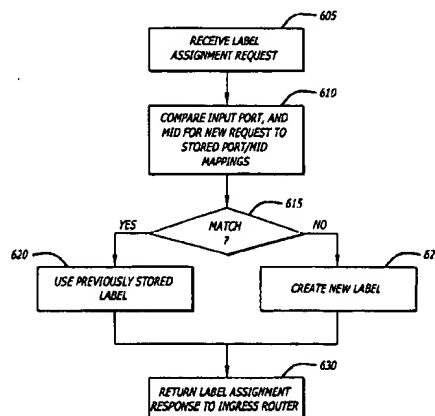
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(57) **ABSTRACT**

A method and apparatus for stream aggregation in a multi-protocol label switching network environment. According to one embodiment, the method comprises receiving a label assignment request that includes an identification of a path followed by the label assignment request through the network and determining whether the path has been used by any of a plurality of previous label assignment requests. A new label is assigned for the path if the path has not been used by any of the plurality of previous label assignment requests. Otherwise, a previously assigned label is assigned.

**26 Claims, 7 Drawing Sheets**



OTHER PUBLICATIONS

Bruce Davie, Yakov Rekhter, Eric Rosen, Arun Viswanathan, Vijay Srinivasan, and Steven Blake. "Use of Label Switching With RSVP." Mar. 1998. Internet Draft. Network Working Group. pp. 1-12.\*

Fred Baker and Yakov Rekhter. "Tag Swithing with RSVP." Dec. 1996. Internet Draft. pp. 1-7.\*

Le Frucher, F., "IERF Multiprotocol Label Switching (MPLS) Architecture" 1998 1st IEEE International Conference on ATM. ICATM '98. Conference Proceedings, Colmar.

France, Jun. 22-24, 1998, IEEE International Conference on ATM, New York, NY: IEEE, US, Jun. 22, 1998, pp. 6-15, XP010290976; ISBN: 0-7803-4982-2.

\* cited by examiner